

Section 3.1.1 Water and Riparian Corridor

Table 3.1-9. Past, Present, And Reasonably Foreseeable Future Actions Within The Chattooga River Watershed.

State	Activity	Year(s) Implemented	Acres/Miles Affected	Past	Present	Reasonably Foreseeable
GA	Roach Mill Rx Burn	2004	550 a	X		
	Licklog Rx Burn	2004	790 a	X		
	Sarah's Creek Campground Upgrade	2004	30 a	X		
	Holcomb Creek Campsite Rehab.	2004	3 a	X		
	Westfork Streambank Stabilization	2004	0.5 a	X		
	Walking Stick Road Heavy Maint.	2004	2.5 m	X		
	Lucy Gap Road Reclosure	2004	0.5 m	X		
	Sarah's Creek Road Closure	2004	0.5 m	X		
	Laurel Creek Mine Rehab	2004	2 a	X		
	Bad Creek SPB Regeneration	2004	15 a	X		
	Wildlife Opening Expansion – Warwoman WMA	2004	3 a	X		
	Salvage of SPB Mortality on Rock Cr. Road	2004	5 a	X		
	Deaden Timber Complex Erosion Reduction	2004-2005	2 m	X		
	Watergauge Firewood Area	2004-2005	10 a	X		
	Closure & Soil/Water Rehab of Three Abandoned County Roads	2005	5.5 m	X		
	Hwy 76 Bridge Replacement	2005	1 a	X		
	Wolf Creek Rx Burn	2006	130 a	X		
	Fish Passage & Habitat Enhancement; Brook Trout Restoration/Renovation	2006	3 m	X		
	Ridley Branch Dispersed Site Closure	2006	0.5 a	X		
	Duck's Nest Gap Rx Burn	2006	1050 a	X		X
	Highway 28 Wildfire	2006	180 a	X		
	Burn 2 on Big Ridge	2006	1150 a	X		
	Wolf Creek Church Firewood Area	2006-2007	5 a	X		
	Roach Mill Rx Burn	2008	695 a	X		X
	Chintilly Rx Burn	2008	230 a	X		X
	Rabun Bald Trail Reroute	2008-2010	3.5 m		X	
	Watergauge Yellow Pine-Oak Woodland Restoration (Rx Burn)	2009	232 a			X
	Tri-District Land Exchange	2009	157 a			X
	Bartram Trail Reroute @ Wilson Gap	2009	0.5 m	X		
	Satolah Soil and Water Complex	2009			X	
	Camp Creek Rx Burn	2009	1800	X		X
	Upper Warwoman Vegetation Management	2009-2010	200 a			X
	Invasive Plant Eradication	2009-2011	25 a			X
	Herbicide Release of Young Forest Communities	2009-2012	150 a			X
	Vegetation Management for Forest Health	2009-2014	250 a			X
	Woodall Shoals Rx Burn	2010-2011	1100 a			X
	Buckeye Branch/Licklog Rx Burn	2010-2011	2470 a			X
	Willis Knob Horse Trail Reroutes	2010-2014	5 m			X
	Sarah's Creek Crossing Replacement	2009	0.05 m		X	
SC	Sandy Ford Rx Burn	2002, 2005	400 ac	X		
	Loblolly Thinning/Removal	2010-2014	1000 ac			X
	Crane Mountain RX Burn	2009, 2013	300 ac			X
	Earls to Sandy Rx Burn	2010	1000 ac			X
	Whetstone Thinning	2008-2009	64 ac	X	X	
	Garland Tract Rx Burning and Dove Field Mtc	2004-2014	600 ac	X	X	X

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State	Activity	Year(s) Implemented	Acres/Miles Affected	Past	Present	Reasonably Foreseeable
SC	FSR 719 Reconstruction	2009-2010	2.4 mi			X
	Horse trail closures, relocations	2010-2011	10 miles			X
	Horse camp reconstruction	2010	12 acres			X
	Burrells Ford Campground Reconstruction	2009-2010	6 acres			X
	Russell Farmstead Interpretive Living Farm	2010-2014	40 acres			X
NC	Cane Creek Road Project (storm project)	2005	1	X		
	Bull Pen Road Reconstruction (storm project)	2006	4	X		
	Chattooga River Trail Reconstruction (storm project)	2006	4	X		
	White Bull/Blue Ox Timber Sales	2007	225		X	
	Bull Pen/Journ McCall Paving Project (NCDOT proposal)	2008	1.5			X
	Whiteside Cove Paving (NCDOT Proposal)	2008	3		X	
	Garnet Hill Paving (NCDOT proposal)	2008	.3		X	
	County Line Road Parking Lot Construction	2009	1			X
All States	Wildlife Opening Maintenance	Ongoing			X	X
	System Road Maintenance	Ongoing			X	X
	Recreational activities including hiking, biking, and driving for pleasure.	Ongoing – various locations			X	X

Source: US Forest Service – Nantahala Ranger District, Andrew Pickens Ranger District, Chattooga River Ranger District

Since cumulative effects are considered for the entire Chattooga watershed, information about existing conditions downstream of Highway 28 are described below. Table 3.1-10 displays information about existing dispersed campsites on Chattooga River downstream of Highway 28 and the West Fork Chattooga.

Table 3.1-10 Data On The Size And Number Of Existing Camps On The Lower Chattooga.

Reach	# of Camps	# of Camps within 20 Ft. of the river	# of Camps/River Mile	Total Bare Ground (sq. ft.)	Total Cleared Area (sq. ft.)
Hwy 28 to Hwy 76	70	12	3.5	26,788	82,552
Hwy 76 to Tugaloo	17	1	2.8	4,414	15,099
West Fork Chattooga	14	2	2.3	940	40,188
Total	101	15	n/a	32,142 (0.7 acres)	137,839 (3.2 acres)

Sources: USDA 2007 and Whittaker and Shelby 2007

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Table 3.1-11 displays existing trail mileage and erosion problems for the lower Chattooga River and the West Fork. Table 3.1-12 summarizes additional trail information and the extent of erosion associated with existing trails in close proximity to the lower Chattooga and West Fork.

Table 3.1-11. Summary Of Existing Trail Information For The Lower Chattooga River And The West Fork Chattooga.

Reach	Designated Trails (mi)	User-created Trails (mi)	# of Erosion Points	User-created Trail Miles per River Mile	# of Erosion Points per Trail Mile	# of Erosion Points per River Mile
Hwy 28 to Hwy 76	36.8	18.6	72	0.9	1.3	3.6
Hwy 76 to Tugaloo	3.0	7.5	11	1.3	1	1.8
West Fork Chattooga	5.4	7.0	8	1.2	0.6	1.3
Total	45.2	33.1	91	n/a	n/a	n/a

Sources: USDA 2007, and Whittaker and Shelby 2007

Table 3.1-12. Summary Of Existing Trail Information For Trails In Close Proximity To The Lower Chattooga River And The West Fork Chattooga River.

Reach	Designated Trail Within 100 ft of River (ft)	User-created Trails Within 100 ft of River (ft)	Designated Trail Within 20 ft of River (ft)	User-created Trails Within 20 ft of River (ft)
Hwy 28 to Hwy 76	28,645	44,089	2,648	8,344
Hwy 76 to Tugaloo	1,001	6,135	307	1,690
West Fork Chattooga	254	16,704	312	10,517
Total	29,900 (5.7 mi.)	66,928 (12.7 mi.)	3,267 (0.6 mi.)	20,551 (3.9 mi.)

Sources: USDA 2007, and Whittaker and Shelby 2007

Alternative 1 – Direct and Indirect Effects

Implementation of Forestwide Standard 81 in the Sumter LRMP will rehabilitate and close all backcountry dispersed campsites within 50 feet of the Chattooga River and its tributaries in South Carolina. Replacement campsites will likely be constructed outside the 50-foot zone although not as many campsites would be constructed as close to one another. This redistribution of campsites, as well as closing or designating user-created trails, will reduce erosion and sedimentation.

Alternative 1 – Cumulative Effects

This alternative would not create new sources of sedimentation; current sediment problems at campsites would be reduced through mitigation of existing resource damage. These improvements may be offset by further resource damage if the number of user-created camps and trails continues to increase as use increases. Ongoing management actions associated with the maintenance of roads, trails and recreation sites would continue.

Cumulative effects of the other alternatives are discussed at the end of section 3.1.1.

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Alternative 2 – Direct and Indirect Effects

Overall, this alternative will result in reducing the potential for sedimentation. New campsite restrictions will alleviate some erosion and sedimentation as displayed in Table 3.1-13. As site-specific projects are implemented, the agency would ensure that water quality is maintained or improved through the use of vegetative buffers, minimizing concentrated flow or hardening of designated sites.

Table 3.1-13. Estimated Number Of Potential Campsites Closed And Ground Rehabilitated, Based On Campground Spacing Described In Alternative 2.

Reach Name	Potential # Camps Closed ¹	Bare Ground Rehabilitated (sq. ft.) ²	Cleared Area Rehabilitated (sq. ft.) ²
Chattooga Cliffs	0	0	0
Ellicott Rock	20	7,000	30,000
Rock Gorge	0 (if designated campsites are not considered)	0	0
	25 (when all campsites are considered)	18,750	42,500
Nicholson Fields	9	2,070	8,550
Total	54	27,820	81,050

¹ The potential number of camps closed in this alternative was calculated by determining the number of campsites in each reach that would result in an average of four sites per mile, and subtracting that number from the total number of current campsites.

² The bare ground and cleared area rehabilitated were calculated by multiplying the number of potential closed campsites by the average bare ground of each camp per reach and the number of potential closed campsites by the average cleared area per campsite by reach, respectively.

This alternative does not include actions that restrict camping near streams, but instead addresses conditions of unacceptable resource damage. New parking restrictions may result in reduced erosion and sedimentation; however, these effects would be minimal because roads and road use are still present

Alternative 3 – Direct & Indirect Effects

In this alternative, erosion and sedimentation from existing user-created trails would be reduced over time but to a lesser extent than Alternative 2. In addition, Alternative 3 does not have a campsite density limit and would result in fewer campsite closures than Alternative 2. Therefore, somewhat less acreage of rehabilitated dispersed camping sites would occur under this alternative. As in Alternative 2, designated campsites would include features to mitigate erosion and sedimentation. Reduced impacts from parking would be the same as in Alternative 2.

Alternative 4 – Direct and Indirect Effects

Erosion and sedimentation from existing user-created trails would be the same as Alternative 3. Impacts from parking would be the same as Alternative 1. As use increases in the corridor, user-created features such as campsites and trails would be expected to increase over time if not monitored.

Increased use of County Line Road Trail by boaters to reach the confluence of Norton Mill Creek and the potential increase in user-created trails by boaters could result in slightly more

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compaction, erosion and sedimentation than in alternatives 2 or 3. This alternative stipulates that no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga. However, the potential for unauthorized LWD removal increases in sections of the upper Chattooga opened to boating.

Alternative 5 – Direct and Indirect Effects

Direct and indirect effects from existing trails and dispersed camping are expected to be similar to Alternative 4. Reduced impacts from parking would be the same as Alternative 2. Impacts from increased use in the corridor would be similar to Alternative 4. Potential sedimentation impacts from put-ins, take-outs and portage trails would be greater than Alternative 4 because an additional six miles of river would be open to boating. The level of boating and the time of year in which it occurs could also increase impacts. This alternative stipulates that no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga. However, the potential for unauthorized LWD removal increases in sections of the upper Chattooga opened to boating.

Alternative 8 – Direct and Indirect Effects

Direct and indirect effects from existing trails and dispersed camping are expected to be higher than alternatives 4 and 5. Because scenic boating is allowed in this alternative, additional camping and associated impacts may occur. Potential sedimentation impacts from put-ins, take-outs and portage trails are similar in type to those in alternatives 4 and 5, but would occur over a greater extent along 20 miles of river. Additional user-created trails due to scouting and portages around major rapids also may occur. Of all the alternatives, this alternative would likely result in the most potential impacts to water quality and the riparian corridor from sedimentation. Adding boating may result in more campsite use which could lead to increased soil and water impacts. Reduced impacts from parking would be the same as in Alternative 2.. This alternative stipulates that no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga. However, the potential for unauthorized LWD removal increases in sections of the upper Chattooga opened to boating.

Alternative 9 – Direct and Indirect Effects

Direct and indirect effects from existing trails and dispersed camping are similar to Alternative 4. Reduced impacts from parking would be the same as in Alternative 2. Impacts from increasing use in the corridor would be similar to Alternative 5 and would include potential sedimentation impacts from put-ins, take-outs and portage trails as in Alternatives 4 and 5, but along six miles of river – less distance than alternatives 4, 5, 8 or 10. However, boating under alternatives 4, 8, 9, and 10 includes more of the steep Chattooga Cliffs reach which could increase the number of portages and associated erosion and sedimentation impacts. This alternative stipulates that no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga. However, the potential for unauthorized LWD removal increases in sections of the upper Chattooga opened to boating.

Alternative 10 – Direct and Indirect Effects

Direct and indirect effects from existing trails and dispersed camping are similar to Alternative 4. Reduced impacts from parking would be the same as Alternative 2. Impacts from increasing use in the corridor would be similar to Alternative 5 and would include potential sedimentation impacts from put-ins, take-outs and portage trails as in alternatives 4 and 5, but along 20 miles of river. The potential for additional user-created trails due to scouting and portages around major rapids also would exist. While the length of river open to boating is the same as Alternative 8, flow and season restrictions would result in many fewer boatable days and therefore less potential sedimentation impacts than Alternative 8. This alternative stipulates that no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga. However, the potential for unauthorized LWD removal increases in sections of the upper Chattooga opened to boating.

Alternatives 2, 3, 4, 5, 8, 9 and 10 – Cumulative Effects

Studies indicate that unpaved roads and non-point source pollution from private lands are major sources of sediment in the Chattooga watershed (Van Lear et al. 1995; US EPA 1999; Clinton and Vose 2003). Historical land disturbances during the period when many lands in the eastern US were first cleared have also contributed to current sediment loads. Splash dams and poorly located skid roads were used to move logs to local mills. Roads and skid trails were often located near streams and they lacked adequate surfacing and drainage features. Sediment deposited in the stream system during these early disturbances is often referred to as “legacy sediment” within the stream channel. Bank erosion is another in-stream source of sediment that is considered when evaluating overall sediment loading. The upper Chattooga watershed has “legacy sediment” and in-stream sediment present from all these sources.

The current land use/cover for the entire watershed is mostly forested. In 2001, the upper Chattooga watershed (located above the bridge crossing Highway 28) was approximately 94% forested while the entire Chattooga watershed was approximately 90% forested (Table 3.1-14). In 1992, the percentage of forested land cover was higher for both these areas. Table 3.1-8 lists the 2001 land cover classes and their total acreage for private lands in the Chattooga watershed. The majority of private lands have a forested land cover, but some of these lands are developed or used for agriculture. The general trend on private lands is increasing development, but the large percentage of national forest lands in the watershed will help maintain these high percentages of forested land cover. Forested watersheds serve many purposes. Acting as a living filter, forests capture rainfall, regulate stormwater and streamflow, filter nutrients and sediment, and stabilize soils (USDA NA-TP-03-96).

Table 3.1-14. Trend In Forested Conditions In The Upper Chattooga To The Entire Watershed For 1992 And 2001.

Watershed	1992 Acres/Percent	2001 Acres/Percent
Upper Chattooga (above Hwy 28)	41,662 / 98%	39,960 / 94%
Chattooga River (above Tugaloo Lake)	170,620 / 96%	160,980 / 90%

These acres and percentages of forested land cover are approximate.

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Studies from the Chattooga River Ecosystem Management Demonstration project indicate that the upper Chattooga watershed is in good condition. The Van Lear et al. (1995) study indicated that sediment concentrations in the upper Chattooga River watershed were lower than other major subwatersheds like Stekoa Creek, Big Creek (West Fork), and Warwoman Creek. Weber and Isely (1995) assessed water quality across the Chattooga watershed using benthic macroinvertebrates. All 27 sampling sites used in this study rated excellent using the North Carolina Biotic Index (NCBI). This study also evaluated multiple habitat types in a qualitative assessment of the same 27 sites. Overall, the qualitative sample results rated Chattooga River sites good while tributaries were rated excellent.

Table 3.1-9 displays past, present, and reasonably foreseeable future actions within the Chattooga River watershed. In the past five years, 7,627 acres have been prescribed burned on the three national forests. The primary ground disturbing activity associated with prescribed burning includes the construction of firelines. Firelines for prescribed burns often utilize existing features such as roads or streams to minimize the amount of line constructed with equipment. When constructed lines are needed, they are implemented using forest plan standards and Best Management Practices (BMPs). Exposed soils are minimized and then treated to reestablish ground cover and vegetation. The recovery period for these burns is approximately two years (Dissmeyer and Stump, 1978).

Recent timber harvests in the NC portion of the watershed on the national forest for a total of approximately 225 acres and 64 acres in SC. No harvests have taken place within the last five years on national forest lands in GA. However, projects are planned in the future on all three national forests. Primary ground disturbing activities associated with timber harvests include Forest Service system road maintenance (as needed for logging access), temporary roads, skid trails and log landings. When possible, decommissioned roads and skid trails are reused for access, unless the impacts would be greater than use of a different route. These activities are typically short in duration with an estimated recovery period of three years (Dissmeyer and Stump, 1978). Bare soils and concentrated flow are aggressively treated to reduce erosion and sedimentation. Erosion and sedimentation are minimized for these activities through BMP implementation and adherence to forest plan standards.

Table 3.1-9 also indicates there have been eight miles of road reconstruction completed within the past five years. The objectives of the projects were to reshape the roadbed and to improve/install proper drainage structures. This reduces sediment laden water from roads flowing directly into streams. Poorly designed or inadequately maintained roads represent the greatest potential source of sediment input to tributaries in undeveloped (largely forested) watersheds. Properly installed drainage structures and maintenance practices substantially reduce sediment movement from forest roads (Clinton and Vose, 2003). Other road projects that have been or will be implemented within the watershed to reduce cumulative sediment sources include road closures and rehabilitation projects. In addition, road reconstruction and road paving have or will be implemented to reduce sediment input to streams.

Table 3.1-15 indicates the total miles and road density for both the entire Chattooga watershed and the upper Chattooga watershed (that portion above the Highway 28 bridge). This summary includes FS, state, county, and local road networks. These roads have a variety of surface types,

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including native material, gravel and asphalt. Roads maintained by the FS are on a schedule to receive maintenance, resurfacing and needed improvements. These activities are taking place annually on FS maintained roads within the watershed. County road maintenance activities are also ongoing. Some roads in the watershed receive little or no regular maintenance.

The limited designated parking within the watershed is a relatively minor sediment source compared to sediment from roads. Closing parking near Burrells Ford Bridge with alternatives 2, 3, 5, 8, 9, and 10 would reduce overland water flow as a result of impervious surfaces near this crossing. These former parking areas would become less compacted over time and would result in more water percolating into the ground. Rehabilitation of the lost parking areas would also reduce sediment originating from these sites. Cumulatively, there would be less parking effects over time (erosion and sedimentation).

Table 3.1-15. Road Density.

Watershed	Chattooga River Watershed	Upper Chattooga River Watershed
Road Density (mi/mi ²)	2.67	2.14
Road Miles	746	142

Source: USFS GIS data set, 2009.

Other projects that are being implemented or will be implemented in the future to reduce sediment input to streams include closure of dispersed sites and horse trails and trail reroutes.

Today, the watershed continues to be predominantly forested with most of the private lands in the upper watershed concentrated in the Cashiers, NC area. The upper Chattooga watershed is in overall good condition as a result of the high percentage of forested land cover and FS/County efforts to mitigate sediment delivered from the road and trail networks. In addition, the upper Chattooga watershed also includes the 8,274 acre Ellicott Rock Wilderness or about 19.5 percent of the area above Highway 28. This also helps account for the overall good condition of this portion of the watershed.

The Forest Service has undertaken recent projects to address water quality and sedimentation issues within the entire watershed. During the Chattooga River large scale watershed restoration project, the FS implemented major restoration or reconstruction projects to mitigate existing sediment sources identified by Van Lear, agency personnel and others. Table 3.1-16 summarizes the Project improvements through the year 2002. The benefits of this large scale restoration effort continue today. They have improved water quality and enhanced aquatic habitats.

Table 3.1-16. Chattooga River Large Scale Watershed Restoration Project.

Restoration Action	Total (unit)
Trails rehabilitated	150 miles
Roads rehabilitated	81 miles
Heavy road maintenance	319 miles
Illegal ATV trails revegetated	80 acres
Recreation sites rehabilitated (camp sites)	23 sites
County roads rehabilitated using Wyden Amendment	24 miles
Streambank stabilization	1250 feet

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Activities or requirements within each alternative would further contribute to reducing cumulative watershed effects from sedimentation. User-created trails and campsites would be eliminated or designated over time, which includes bringing them to current standards. Designated trails would be evaluated for possible reroutes to mitigate environmental degradation. Although sediment contributions from trails and campsites are estimated to be less than contributions from roads and other major sources, reducing recreation-related sediment sources would improve in-stream conditions over time. This conclusion is based, in part, on the 2007 biophysical inventory that documented intensive recreation use within the corridor, including numerous user-created features (trails and campsites) and erosion sites. These user-created features are often adjacent to streams, which can result in chronic sediment sources.

Campsites

Proposed actions for campsites vary across alternatives 2-5 and 8-10. Overall, the alternatives do not include actions that restrict camping near streams, but instead address conditions of unacceptable resource damage. Designated campsites would also be evaluated to determine if any mitigation measures are needed to minimize erosion and sedimentation. These activities would further reduce existing sediment sources throughout the watershed. See USDA (2007), table 3, for a summary of the number of campsites in the Chattooga watershed, the upper Chattooga watershed, and within 20 feet of the Chattooga River.

Access and Trails

Access for boaters would utilize existing trails, old roadbeds, existing bridge crossings or other user-created features for put-in and take-out. Designated put-in/take-out trails would be reconstructed as needed and maintained to current forest plan standards. Additional user-created trails from boating activities would be discouraged, but difficult to control. Portage trail needs would be addressed while trying to minimize potential resource impacts. There is no new road or trail construction proposed for any alternative.

The alternatives that include boating would likely add varying amounts to the increasing number of users, thereby potentially increasing slightly the impacts from sedimentation. There would be ground disturbing activity resulting from access trails, portage trails and additional user-created trails, but the total length of these trails or the amount of ground disturbance associated with these activities would be small compared to the total miles of existing trails and roads in the upper Chattooga watershed (see Table 3.1-15 and Table 3.1-17 for miles of existing roads and trails, respectively). See Table 3.1-18 for an estimate of additional trail needs associated with boating activities. This table identifies different trail types or access needs associated with boating. It also estimates these trail lengths.

Table 3.1-17. Total Miles Of Existing Designated Trails And User-Created Trails For Both The Chattooga Watershed (Above Tugaloo Lake) And Upper Chattooga Watershed (Above Hwy 28).

	Chattooga River Watershed miles (miles / square mile)	Upper Chattooga Watershed miles (miles / square mile)
Designated trail	80.2 (0.29)	35 (0.54)
User-created trail	52.5 (0.19)	19.3 (0.30)

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Table 3.1-18. Estimated Length Of Trail Features Reconstructed Or Created In The Upper Chattooga For Alternatives 4, 5, 8, 9, And 10, As A Result Of The Addition Of Boating.

Feature	Estimated Number/Length	Source
Designated put in/take out locations (except for Norton Mill Creek)	Alternatives range from a total of 3-7 put-ins and take-outs; each estimated to be ¼ mile in length for up to a total of 1-2 miles of trail depending on alternative	Existing user-created trails that would be reconstructed to meet current standards
Norton Mill Creek put-in aka County Line Trail (alts 4, 8, 9, 10)	Approximately 1.5 miles	An old road-bed that would be reconstructed as needed and a short section of designated trail
Portage for rapids or woody debris accumulation	Total length for both these features is estimated to be ½ mile	Existing user-created features and creation of new footpaths in some areas
User-created trail	19.3 miles currently in the upper Chattooga watershed	Some existing user-created trails will continue to be used. Existing user-created trails would also be analyzed for further treatment, with some being obliterated. Some new user-created trails are expected for alternatives that include boating, but their use would be discouraged

In addition to the activities in Table 3.1-18 related to boating, there would also be management activity within the entire Chattooga watershed to improve watershed conditions as described above. Boating would result in additional ground disturbance but there would be an overall net reduction in sediment when watershed improvement projects are implemented. Watershed improvements include evaluation and treatment of user-created trails, user-created campsites and erosion sources. Additionally, designated trails, campsites and roads are maintained to minimize sediment sources.

Mitigation measures would be utilized to minimize the direct, indirect and cumulative effects for these alternatives. Mitigation measures include the use of forest plan standards, state erosion/sedimentation control programs, and BMPS for forestry and forestry-related activities. Additional mitigation measures may be applied as needed when site-specific projects are implemented. All water quality regulations or guidelines are expected to be met in each alternative.

3.1.2 Soils

SUMMARY OF FINDINGS

In analyzing the proposed alternatives, the soils analysis examined impacts associated with trails, campsites, parking areas, roads and potential portaging needs in the upper Chattooga corridor. The primary impacts on soils in the upper Chattooga River corridor are expected to be associated with erosion, sedimentation and compaction. Although existing user-created trails, dispersed campsites and parking areas, along with chronic erosion points, are ongoing sources of soil impacts, they are minor when compared with chief contributors to erosion and sediment input such as roads and road maintenance. Similarly, impacts from introducing boating also would be minor.

Over time, implementation of forest standards and BMPs in Alternative 1 would reduce existing levels of soil erosion and compaction, although these improvements may be slowed by continuing increases in overall use that create new biophysical impacts. The other alternatives propose reductions in impacts to soils by closing and rehabilitating problematic campsites and closing or mitigating damaged trails. All alternatives, except 1 and 4, eliminate roadside parking near Burrells Ford Bridge which also would reduce impacts to soils. Alternative 2 is expected to provide the greatest reduction in impacts by lowering current user levels and restricting all users. The boating alternatives all include the potential for designated portage trails around log jams in the river. Alternatives 4 and 5 would have the lowest portage impacts; Alternative 8 is expected to have the highest likelihood of increased erosion and sedimentation from increased portages. However, as noted previously, impacts from introducing boating would be minor.

AFFECTED ENVIRONMENT

Two primary soils exist in the upper Chattooga River corridor: (1) micaceous soils, which erode easily and are prominent near the South Carolina and North Carolina border, and (2) upland soils, which are located on gently sloping to very steep ridges and side slopes with a high level of clay and usually stable on gently sloping terrain. Two others make up less than 10 percent of soils: (1) alluvial flood plain soils, which are stable when undisturbed but susceptible to compaction and/or erosion when disturbed, and (2) colluvial soils, which are sensitive to ground-disturbing activities due to their severely erosive and unstable nature.

These soils have various levels of sensitivity to impacts from trails, campsites and parking areas. Table 3.1-19 lists each activity and rates its potential effects to the soil resource. The following assumptions were used:

- Trails and campsites are located on grades of less than 12 percent, with dips and other structures that limit concentrated flows;
- At least a 20-foot buffer of vegetative cover of trees next to the river can be sustained through management;
- Parking lots are graveled and roadside parking is managed, with erosion control and stormwater mitigations installed and functioning.

Table 3.1-19. Soil Ratings For Recreation Use Activities

Soil Types	Trails	Campsites	Parking Areas
Micaceous (42.3%)	H	H	H
Upland (44.8%)	L-M	L	L-M
Colluvial (8.9%)	H	H	H
Alluvial (2.3%)	M	M	M

L = Low sensitivity

M = Medium sensitivity

H = High sensitivity

The Chattooga Cliffs and Rock Gorge reaches are rated high soil sensitivity because of soil texture and steepness of slopes. West Fork reach has low soil sensitivity because of flatter terrain and upland soils which are coarser and percolate water faster resulting in less erosion. The other reaches are medium soil sensitivity because of the amount of limited bare soil exposure based on moderate slopes and soil types.

EXISTING IMPACTS TO THE ENVIRONMENT

Existing sources of soil disturbance include designated and user-created trails, dispersed campsites, parking lots, trailheads, roads and wildlife openings. Erosion is occurring along the entire trail system, on roads, parking areas, identified erosion sites, access points and at all campgrounds with bare soil. A total of 91 active sediment delivery erosion points have been identified, totaling 11,087 square feet of eroded areas within the upper Chattooga corridor. A substantial amount of erosion occurs at river access points due to slope and soil types. Roads and parking areas have the potential for erosion depending on their location, condition, slope, grade and surface material. Roads and road maintenance are the chief contributors of erosion and sediment in the Chattooga drainage. Sediment fields from user-created trails, dispersed campsites and parking areas are minor. The addition of boating should not generate measureable amounts of sediment.

In addition to roads, which are the main sediment source, erosion is also associated with:

- *User-created trails* which have more potential for erosion and sediment entering the stream because of their location and lack of design and maintenance. As a result, they are periodically eroded during storm and flood events and become more entrenched over time, as well as more efficient at eroding and delivering sediment.
- *Dispersed campsites* which are of concern due to their sheer number, their lack of design and maintenance and their close proximity to the river. Many contain short segments of user-created trail that connect directly to the water's edge and provide a means for eroded soil to be transported directly into the river. The closer the sites are to the river, the less chance there is for vegetation and litter to trap soil particles.
- *Parking lots and associated trailheads* which are of concern since ditch lines and access trails provide a means for soil to be transported and deposited directly into the river as sediment. All parking lots have graveled surfaces that are maintained by grading. The

trailheads are sometimes located on steep grades and have a compacted soil surface, although a few that are adjacent to roads and stream crossings have rocked surfaces.

- *Roadside parking* which is a concern since it can damage the road berms and roadside vegetation, leaving the soil exposed. The amount of erosion increases from roads during rainfall due to the lack of a vegetative cover protecting the soil surface. Where the road berm is used to control road surface drainage, damage to the berm can cause severe erosion of road fill materials and sediment into the river.

Tables 3.1-4, 3.1-5 and 3.1-6 in Section 3.1.1 display data on existing campsites and trails in the upper corridor, and the associated erosion points for each reach. The following discussion provides additional descriptions of existing soils-related conditions in each reach.

Chattooga Cliffs Reach

The graveled and maintained parking lots at Grimshawes Bridge provide the greatest potential for off-site soil movement because of their association with trailheads and trails that provide direct river access. The stream in this reach is dominated by fine sediment particulates above Grimshawes Bridge that suggests that erosion sources exist and are actively contributing within the eight square mile drainage above this area.

Three erosion sites are located in this reach, most of which are small; however, some are long and narrow down steep grades and sometimes lead to the river. In the past, they were used as access points to the river or as old camp sites. A large percentage of private forested lands exist within this reach. No known agriculture or other ground disturbing activities on private lands occur here.

Ellicott Rock Reach

As the elevation drops, the soils in this reach are somewhat less micaceous than in the Chattooga Cliffs reach. In general, the floodplains and terraces become locally wider. Colluvial soils are found on several locations. The landscape has more floodplains and river terraces which would allow more camping opportunities. Two graveled roads cross the river in this reach (Highway 1178 at Bull Pen and Highway 708/646 at Burrells Ford Bridge).

Rock Gorge Reach

The floodplains and terraces are broader here than in the Ellicott Rock reach. Colluvial soils are found on several locations. Burrells Ford Campground has roads and short access trails from campsites to the river's edge. The campground is slightly sloping, and evidence of erosion can be found at some roads and campsites. Vegetation is broken along the stream bank reflecting recreation use impacts. Most areas are not actively eroding but soil movement into the river likely occurs during high storm events. One gravel road crosses the river in this reach (Highway 708/646 at Burrells Ford Bridge).

Nicholson Fields Reach

The soils in this reach are similar to the Rock Gorge reach, including the floodplains and terraces. Wider floodplains and terraces are located in this reach.

ENVIRONMENTAL CONSEQUENCES**Effects of the Alternatives on Soils****Alternative 1 – Direct and Indirect Effects**

This alternative would reduce soil erosion and compaction over time through mitigation of existing resource damage and application of BMPs. However, these improvements may be counteracted by continuing increases in overall use that create new biophysical impacts. The following discussions describe any differences in expected effects on soils for the four reaches in the upper corridor.

Chattooga Cliffs Reach

Implementation of current forest plan standards and compliance with BMPs or similar soil and water conservation practices designed to limit erosion, sediment and other water quality impacts would reduce the current adverse effects to soils from user-created and designated trails, campsites and parking areas over time through site-specific projects.

Ellicott Rock Reach

This reach occurs on all three national forests and is mostly contained in the Ellicott Rock Wilderness. The small differences in the management of trails, campsites and parking areas for each forest plan would not result in any substantial differences in the environmental effects over time if all were fully implemented. All three forests emphasize protecting riparian areas, soil, water and vegetation by closing, rehabilitating or reconfiguring designated trail systems. The user-created campsites in this reach are on locations with no design techniques employed and receive no maintenance. Although there are no specific campsite standards for the Chattooga corridor itself, each forest relies on forest-wide standards for managing recreation. It is unclear how many campsites might be closed on the Nantahala and Chattahoochee national forests through full implementation of forest plan direction. On the Sumter National Forest, the standard is clear that all campsites within 50 feet of the river would be closed. Over time, current adverse effects to soils from user-created and designated trails, campsites and parking areas would be reduced with implementation of forest plan and wilderness requirements.

Rock Gorge Reach

Similar to the Ellicott Rock reach, current adverse effects to soils from user-created and designated trails, campsites and parking areas would be reduced over time with the implementation of current forest plan standards.

Nicholson Fields Reach

Effects in this reach are the same as those for the Rock Gorge reach.

Cumulative effects for all alternatives are discussed at the end of section 3.1.2.

Alternative 2 – Direct and Indirect Effects

In this alternative, trails, dispersed camping and parking areas affect the soil resource. The effects discussed under Alternative 1 by stream reach relative to erosion points, parking lots and trailheads, roads and bridges would not change.

Reservations for camping would likely reduce the chances of soil erosion from any new campsites. In addition, closing and re-routing trails would reduce chronic erosion from poorly located existing user-created trails, especially those directly on top of stream banks and in riparian areas.

For the other three reaches, the elimination of approximately 40 percent of campsites would result in a substantial reduction in soil erosion, compaction and disturbance. Closing and rehabilitating campsites would allow stream bank vegetation to recover and reduce direct erosion into the river. With rehabilitation and signage to prohibit further camping, these sites would recover quickly and the soil litter layer would again rebuild where bare soil is exposed. This would lead to reduced overland water flow, reduced erosion from flooding and help in rebuilding soils.

User-created trail closures would reduce soil disturbance and compaction leading to improved soil productivity, especially in riparian areas. Fewer impacts on stream banks and limited access to the water's edge would lead to improved bank stability and protection over time. Tree, shrub and grass roots would help stabilize the riverbank and prevent accelerated erosion during flooding in riparian areas.

New parking restrictions would prevent rutting and damage to road ditch lines and cross-drain structures as well as protect roadside vegetation. They also would promote more control of water before it can erode away the ditches and damage or remove vegetation. This alternative also would reduce soil erosion that would result in sedimentation mainly associated with Burrells Ford. Permitting all users and restricting campsites would indirectly reduce erosion and compaction.

Alternative 3 – Direct and Indirect Effects

The effects discussed under Alternative 1 by stream reach relative to erosion points, parking lots and trailheads, roads and bridges are the same for Alternative 3. In addition, the effects of trails and campsites under this alternative are similar to Alternative 2 although not as restrictive.

In the Chattooga Cliffs, additional soil impacts are not expected from that already described for Alternative 1 for this reach. For the other three reaches, soil erosion, compaction and disturbance

associated with camping would decrease but not to the level of Alternative 2. Effects of new parking restrictions on soils would be the same as under Alternative 2.

Alternative 4 – Direct and Indirect Effects

Under this alternative, effects associated with campsites and trails would be similar to those described in Alternative 3. The effects for all stream reaches relative to erosion points, parking lots and trailheads, roads and bridges are the same as Alternative 1.

As stated in Section 3.1.1, designated portage trails may occur under this alternative but not to the extent of the other alternatives that provide boating above Highway 28. As the length of the river available for boating, levels of use and number of portage trails increase, the potential for soil disturbance would increase.

Implementing designated portage trails rather than allowing user-created portage trails would minimize impacts to other resources such as sensitive plants and areas susceptible to soil erosion. Portage trails would move and proliferate depending on changes in the river and the anticipated felling of hemlock; their movement and proliferation may cause increased soil disturbance from compaction and displacement on the trail tread. Erosion and sediment would also increase from exposed soils during intense rainfall and runoff periods.

Alternative 5 – Direct and Indirect Effects

The effects discussed under Alternative 1 by stream reach relative to parking lots and trailheads, roads and bridges are the same for Alternative 5. Effects to campsites and trails (except portage trails) are the same as Alternative 3. Potential designated portage trails in this alternative would have similar impacts to those described in Alternative 4, although the distribution of potential portage trails is expected to be more than in Alternative 4, and use levels and degree of impacts would be slightly higher. Impacts from parking would be the same as in Alternative 3.

Alternative 8 – Direct and Indirect Effects

Under this alternative, effects associated with campsites and trails would be similar to Alternative 3. The other effects discussed under Alternative 1 for all stream reaches relative to erosion points, parking lots and trailheads, roads, and bridges are the same for Alternative 8.

This alternative is expected to have the highest potential impact on soil erosion and compaction since it provides unlimited boating opportunities above Highway 28. Portage frequency and impacts are anticipated to be higher than alternatives 4 and 5 due to higher levels of boating over greater distances. Also, the put-in point for boating starts further upstream than the previous alternatives, so the need for portaging in this steep section of the river is expected to be greater. Four-person rafts allowed in this alternative would likely further increase the number of portages. Overall, the potential for impacts from portage trails is highest for Alternative 8 compared to all other alternatives.

Alternative 9 – Direct and Indirect Effects

Under this alternative, effects to campsites and trails (except portage trails) are the same as those described for Alternative 3. The effects discussed under Alternative 1 by stream reach relative to parking lots and trailheads, roads and bridges are the same for Alternative 9. Impacts from portage trails are less than Alternative 8 and more like alternatives 4 or 5. Impacts from parking would be the same as in Alternative 3.

Alternative 10 – Direct and Indirect Effects

As with the other boating alternatives, effects to campsites and trails (except portage trails) are the same as those described for Alternative 3. The effects discussed under Alternative 1 by stream reach relative to parking lots and trailheads, roads and bridges do not change. The potential for portage trails is greater than in alternatives 4, 5 and 9 but less than in Alternative 8. Impacts from parking would be the same as in Alternative 3.

Cumulative Effects for All Alternatives

Cumulative effects were evaluated at two scales: the upper Chattooga River above Highway 28; and the whole Chattooga above Tugaloo Lake. Cumulative effects analysis discussed in chapter 3.1.1 Water and Riparian Corridor was used to inform the soil cumulative effects analysis and conclusions on likely effects. Natural background erosion levels are typical of that associated with largely forested watersheds.

Past, present and reasonably foreseeable projects are displayed in Table 3.1-9. Cumulative soil erosion and compaction from projects are primarily associated with recreation use (primarily trails and campsites), vegetative management, and maintenance activities associated with roads and trails. The other listed management activities add minor amounts to the total erosion occurring in the watershed. On the other hand, a number of projects have been or will be implemented to specifically target reducing cumulative adverse impacts to soils in the entire watershed and that portion of the watershed above the Highway 28 bridge. These projects are mainly associated with rerouting trails, closing roads, and paving road surfaces aimed at reducing erosion and chronic sediment input to streams. In addition, past projects (Table 3.1-16) associated with trails, roads, campsites and streambank stabilization have been implemented. This has reduced cumulative impacts to soils from erosion and compaction and decreased sediment delivery to tributaries and the Chattooga River itself.

Recreation management activities aimed at reducing impacts associated with erosion and sedimentation have included road, parking lot/trailhead, campsites and trail maintenance in the Chattooga River above Highway 28. This has decreased soil erosion in the watershed. Impacts to soils would be further reduced by directing recreationists to sustainable (stable soil areas that can handle repeated use) designated campsites and trails. Soil and water improvements that are planned in the watershed along with those already completed would result in further cumulative reductions in soil erosion and compaction in the upper portion of the watershed.

Vegetation management projects have and will improve forest health throughout the watershed. The activities result in restoration of native plants and reduce impacts from Southern pine

beetles. This also reduces and prevents impacts from wildfire on soils. Projects aimed at reducing non-native invasive plants (NNIS) also favor the development of native species. These activities enhance forest cover including understory grasses and shrubs and maintain/restore healthy ecosystems which help protect soils in the short and long term.

All of the alternatives would result in closed and rehabilitated campsites, trails and soil erosion points, thus reducing adverse affects on soils. The overall impacts that can be expected if the individual impacts are allowed to accumulate from each action alternative would be a reduction in erosion, sedimentation and compaction both in the upper part of the watershed and in the whole Chattooga River drainage. The overall good condition of the upper potion of the watershed will be maintained in the short term and will improve in the long term under any of the alternatives. The entire Chattooga River watershed would also continue to improve in the short and long term.

Section 3.2 BIOLOGICAL RESOURCES

3.2 BIOLOGICAL RESOURCES

The Vegetation, Wildlife and Aquatic sections under Biological Resources reference a status rank to certain species in the analyses. Nature Serve (2007) assigns a global conservation status rank to species. The state natural heritage programs use the same ranking standards, but on a state level instead of a global level (see Table 3.2-1)

Table 3.2-1 Global and state conservation status ranks to species (Nature Service 2007 and SC, NC and GA state natural heritage programs)

Global status rank	State status rank	Meaning
G1	S1	Critically Imperiled – at very high risk of extinction due to extreme rarity, very steep declines or other factors
G2	S2	Imperiled – at high risk of extinction due to very restricted range, steep declines or other factors
G3	S3	Vulnerable-at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors
G4	S4	Apparently Secure – uncommon but not rare; some cause for long term concern due to declines or other factors
G4Q		G4 species with questionable taxonomy that may reduce conservation priority
G5	S5	Secure – common, widespread and abundant
GNR	SNR	Not Ranked – the rank has not been assessed
G4Q		G4 species with questionable taxonomy that may reduce conservation priority
	S?	Uncertain Rank – Inexact or uncertain numeric rank

To help evaluate the effects of management practices on plants, animals and fisheries, the management indicator species (MIS) concept is used in this section of the analysis. MIS are defined as an animal or plant species selected for use as a planning tool in accordance with 1982 National Forest Management Act regulations (36 CFR 219.19). They are used to help set objectives, analyze effects of alternatives and monitor plan implementation. MIS are chosen because their population changes are believed to indicate the effects of management on selected biological components. Management indicators refer to communities (all the plants and animals that represent that community) that serve the same function.

For the purposes of this section, the Nantahala National Forest in North Carolina will be referred to as NNF; the Chattahoochee-Oconee National Forest in Georgia will be referred to as CONF; and the Sumter National Forest in South Carolina will be referred to as SNF.

3.2.1 Vegetation**SUMMARY OF FINDINGS**

The vegetation assessment analyzes impacts to the following plant groupings: 1) ecological communities; 2) the plant species specifically associated with the biology ORV (see Appendix A); 3) MIS; and 4) the proposed, endangered, threatened, sensitive (PETS) and locally rare plant species in the Chattooga River corridor. Potential effects on vegetation from the proposed alternatives fall into two primary categories—trampling of plants by recreation users and introduction of additional non-native invasive plant species.

The potential for introducing new outbreaks or new non-native invasive species (NNIS) to the riparian corridor from recreation visitors should be limited to small selected areas and is not expected to increase dramatically under any of the alternatives. Recent studies have shown that existing users are already affecting vegetation along the corridor by trampling and clearing vegetation around campsites, erosion and loss of plants along user-created trails, damaged trees, denuded banks at stream crossings and the potential for damage to rare species in sensitive settings along rock cliffs and gorges. Additional effects from boating will depend on the level of use under the various alternatives but could increase impacts such as trampling of streamside plants due to increased access and portage trails and scraping of vegetation on rocks at low flow levels.

The degree of direct and indirect effects on vegetation will vary due to microhabitat preferences, susceptibility of individual plants and population sizes, as well as the anticipated level of recreation use under the various alternatives. Increased visitation, particularly in the Chattooga Cliffs reach, could result in viability concerns for certain rare plant species that have limited populations across the forest and small population sizes. However, with the monitoring described in each alternative that provides boating in the upper corridor, potential impacts on vegetation would be reduced. While direct and indirect effects from the proposed actions may contribute to a reduction in the size of certain rare plant populations, none of the alternatives are anticipated to result in the loss from the corridor of any existing species, provided the monitoring measures are implemented and future decisions regarding portage trails adequately assess and avoid impacts.

AFFECTED ENVIRONMENT

The dominant geological characteristics of the Chattooga River corridor have greatly influenced vegetation types. Both greywacke-schist and greywacke-schist-amphibolite comprise more than three-quarters of the watershed area (Hatcher 1978, USDA Forest Service 1995). Mica gneisses, feldspathic gneisses, quartzite and aluminum schist dominate the basin. The mafic derived rocks, amphibolites, are generally scarce, and, as such, the soils tend to be less productive and plants within the heath family are particularly abundant across the watershed.

1. Ecological Communities

Table 3.2-2 lists the acreage managed by the three national forest units for the different ecological types present within the Chattooga watershed and the upper and lower wild and scenic corridor. This database shows that about 46 percent of the watershed is dominated by hardwood